

Immune System Problems

By: Shelita Montgomery MSN, RN-BC.

Immune Responses

- Immunity - the body's capacity to resist invading organisms and toxins, thus preventing tissue and organ damage.
- Immune System recognizes, responds to, and eliminates antigens.
- Immune disorders
 1. Autoimmunity-normal protective immune response paradoxically turns against or attacks the body leading to tissue damage. Ex: SLE, RA
 2. Hypersensitivity-body produces inappropriate or exaggerated response to specific antigens
 3. Gammopathies- immunoglobulin overproduction
 4. Immune deficiencies (Primary and secondary)
 - Primary Immune deficiency- from improper development of immune cells or tissues; usually with a genetic basis; underdeveloped immune system
 - Secondary Immune Deficiency- from interferences with already developed immune system; usually acquired later in life

Immune Response

- Immune responses serve three functions.

1. Defense

- The body protects against invasions by micrororganisms and prevents the development of infections by attacking foreign antigens and pathogens.

1. Homeostatsis

- Damaged cellular substances are digested and removed. Through this mechanism, the body's different cell types remain uniform and unchanged

1. Surveillance

- mutations continually arise in the body but are normally recognized as foreign cells and destroyed.

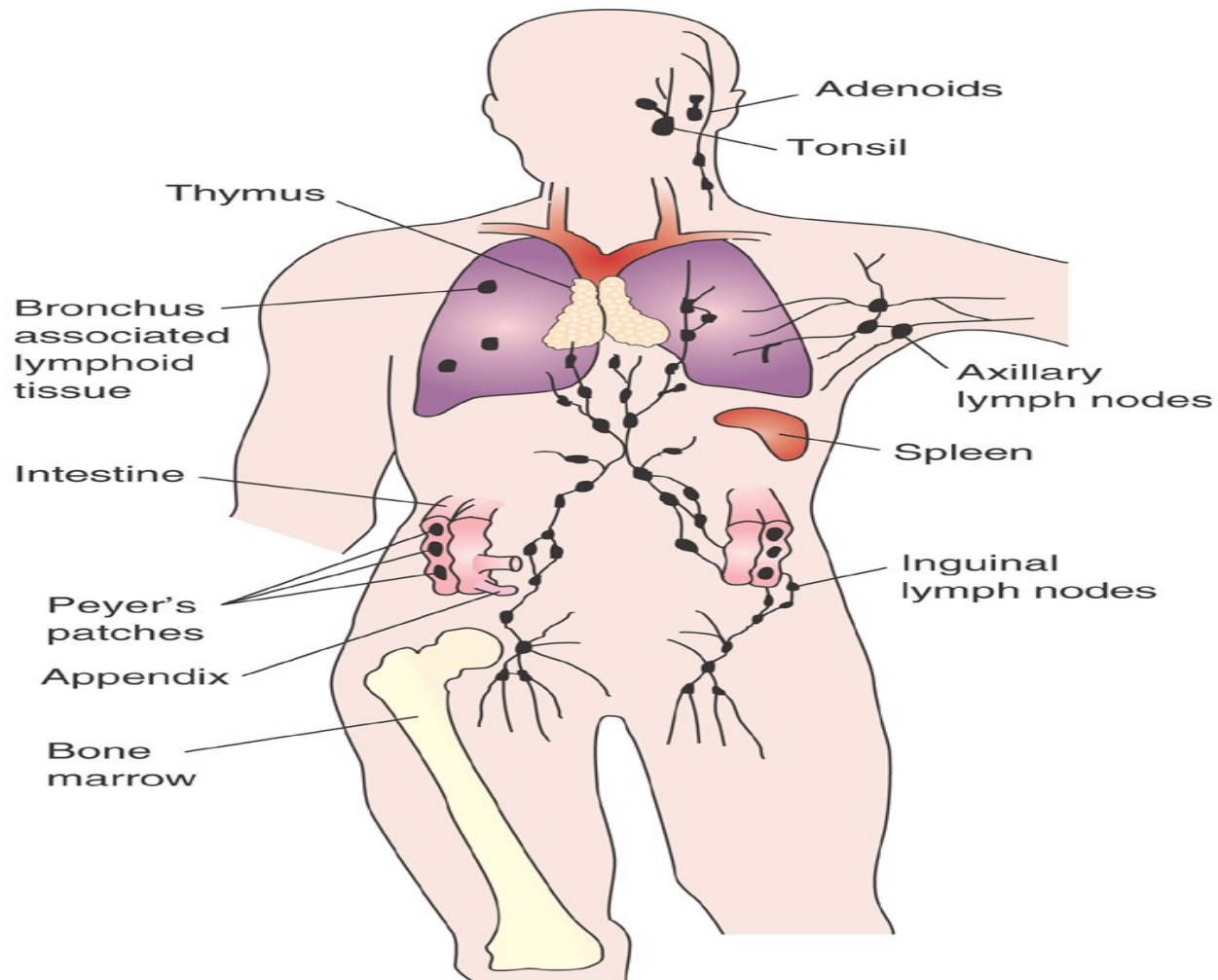
Immunity Classifications

- Innate or natural immunity- exist in a person without prior contact with an antigen; natural contact with antigens through clinical infections. E.g recover from chickenpox, measles and mumps)
 1. Active natural
 2. Passive natural- Transplacental or colostrum transfer from mother to child (maternal immunoglobins in neonate)
- Acquired Immunity- development of immunity either passive or artificial.
 1. Active acquired immunity- active artificial- Immunization with antigen (immunization with live or killed virus).
 2. Passive acquired immunity- Passive artificial- injection with gamma globins (serum antibodies), short lived because the body did not synthesize the antibodies and does not retain memory cells for the antigen. E.g IVIG, plasma exchange. **Temporary immunization transferred from outside the body**

Immune System

- Consists of:
 - Lymphocytes and macrophages
 - Lymph nodes- are connected to lymph channels and capillaries, which remove foreign material before it enters the blood stream
 - Spleen- acts like a filter
 - Thymus- where t cells mature
 - Bone marrow- produces WBCs and B-cells mature here
 - Tonsils- aid in filtering
 - Adenoids- aid in filtering
 - Appendix

Immune System



Question.

Tell whether the following statement is true or false.

Active immunity is temporary immunity transmitted from a source outside the body that has developed immunity through previous disease or immunization.

False- this is passive immunity

Variables That Affect Immune System Function

- Age and gender
- Nutrition
- Presence of conditions and disorders: cancer/neoplasm, chronic illness, autoimmune disorders, surgery/trauma
- Allergies
- History of infection and immunization
- Genetic factors
- Lifestyle
- Medications and transfusions: see Table 50-6
- Psychoneuroimmunologic factors

Rheumatic Diseases

- Also called arthritis, rheumatic diseases include more than 100 different disorders
- They primarily affect the joints, but also muscles, bone, ligament, tendons, and cartilage
- Classification
 - Monoarticular (affecting one joint) or polyarticular (affecting multiple joints)
 - Inflammatory or noninflammatory

Diffuse Connective Tissue Diseases

- A group of chronic disorders characterized by diffuse inflammation and degeneration in the connective tissue
- Cause is unknown but thought to have an immunologic basis
- Characterized by a clinical course of exacerbations (flare ups) and remissions (no signs and symptoms)
- Includes rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), scleroderma, polymyositis, and polymyalgia rheumatica

SYSTEMIC LUPUS ERYTHEMATOSU S

Facts about Systemic Lupus Erythematosus

- Lupus is a prototype autoimmune disease with a wide array of clinical manifestations
- Primarily a disease of young women
- Occurs from infancy to old age, with peak occurrence between ages 15 and 40.
- Blacks (and possibly Hispanics, Asians, and Native Americans) are affected more than whites.
- May occur with other autoimmune conditions (e.g., thyroiditis, hemolytic anemia, idiopathic thrombocytopenia purpura).

Pathophysiology

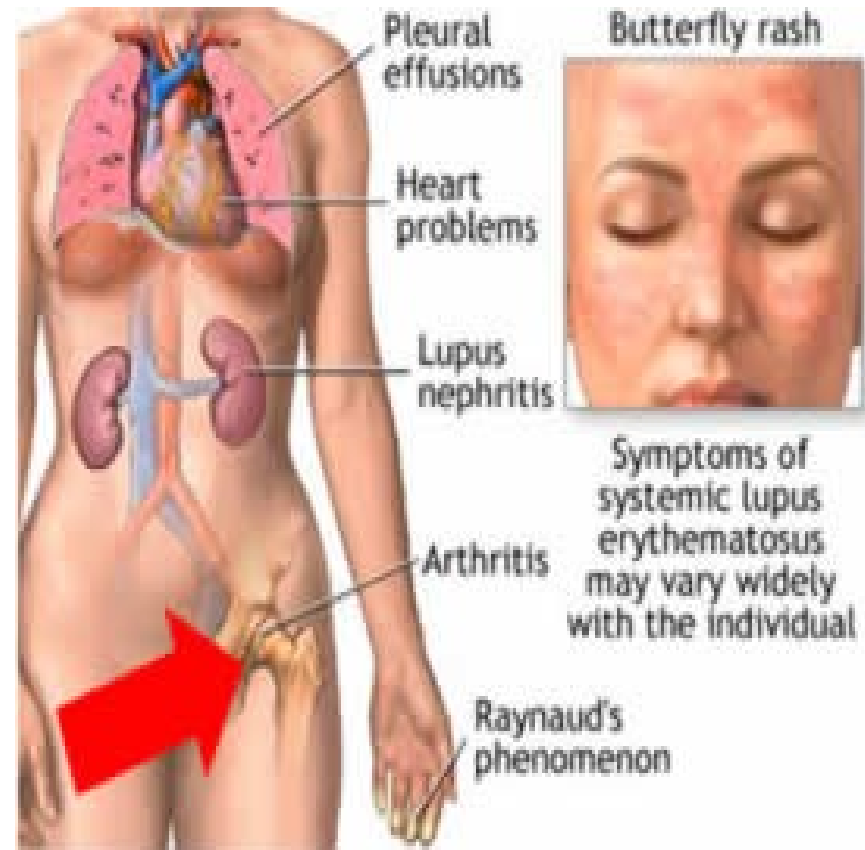
- Disturbed immune regulation causing an exaggerated production of autoantibodies
- Brought about by a combination of genetic factors, hormonal factors (pregnancy, menstrual cycle, birth control), and environmental factors (sunlight, thermal burns)
- Lupus is an autoimmune systemic disease that can affect any body system. Involvement of the musculoskeletal systems with arthalgias and arthritis (synovitis) is a common presenting feature of SLE; joint problems with morning stiffness
- Certain medications have been implicated in chemical or drug induced SLE
 - Apresoline (hydralazine)- antihypertensive
 - Pronestyl (procainamide)
 - INH (isoniazid)- used to tx TB
 - Thorazine (chlorpromazine)-antipsychotic, sometimes given for hiccups
 - Some seizure medications

Clinical Manifestations

- Onset may be acute
- Can affect any body system
- Synovitis- inflammation in joints
- Joint swelling, tenderness, and pain on movement
- Butterfly-shaped rash across the bridge of the nose and cheeks (classic sign!)
- Pericarditis- most common cardiac manifestation; women with SLE at risk for atherosclerosis
- Renal involvement- may lead to HTN; serum creatine levels and urine analysis used for screening renal involvement
- CNS involvement- depression and psychosis are common
- Plural Effusions
- Raynauds- cyanosis of fingers due to vasoconstriction; may be brought on by stress and cold
- Alopecia may occur
- Osteonecrosis may develop- bone death due to lack of oxygen; seen in pts treated with prednisone for more than 5yrs; the hip bone is most commonly affected



Clinical Manifestations



Laboratory Assessment

- Discoid Lupus Erythematosus (DLE)-*only affects the skin, need skin biopsy to dx*
- System Lupus Erythematosus
 - RA factor-
 - ANA
 - Sed rate- *may be increased indicating inflammation*
 - Serum compliments C3 and C4- *will be positive*
 - False positive VDRL- *used to dx STDs*
 - CBC- *decrease in all cells; dancytopenia?*
 - Anti-DNA - *positive*
 - Anti-Smith (sm) - *positive*
 - Lupus erythematosus (LE) cell prep test- *nonspecific test for SLE and is positive in other rhematic diseases.*

Medical Management

- Applying corticosteroid cream for rashes.
- Non-steroidal anti-inflammatory drugs (NSAIDs) for mild joint or muscle pain and fever.
- Anti-malarial medicines to treat fatigue, joint pain, skin rashes, and lung inflammation.
 - Do not work right away, may take a few months to achieve therapeutic dose
 - Frequent eye exams required bc antimalarials can cause retinopathy-s/s can be reversed when drugs are d/c
 - If antimalarial drugs are not tolerated they are treated with antiepilepsy drugs
- Low-dose corticosteroids if other medicines are not controlling your symptoms. (mild disease activity) (glucose will elevate)
- High-dose oral steroids (for major disease activity)
- Use of Immunosuppressive agents (used in severe cases that do not respond to conservative treatments)

Question

Which of the following medications is the single most important medication available for the treatment of SLE?

- a. NSAIDs
- b. Immunosuppressives
- c. Antimalarials
- d. Corticosteroids

Management

- Rest to reduce stress.
- Avoid the sun. Wear sunscreen and protective clothing when you are outside.
- Exercise regularly to prevent fatigue and joint stiffness.
- Stop smoking.
- Learn the warning signs of a symptoms flare, such as fatigue, pain, and rash, and take steps to control them.

Nursing Diagnosis

- Fatigue related to chronic inflammation and altered immunity
- Acute pain related to inflammatory processes and inadequate comfort measures
- Impaired skin integrity related to photosensitivity, skin rash, and alopecia.
- Knowledge deficient related to lack of exposure to and unfamiliarity with information resources.

Questions

Be Sure to read chart 54-2
Care of the client with Rheumatic
Disease

Rheumatoid Arthritis

Paulette Johnson, MSN, RN
Revised by: Shelita Montgomery, MSN, RN.

Video

[H:\video on rheumatoid arthritis.htm](#)

What is Rheumatoid Arthritis (RA)?

- Also known as inflammatory arthritis
- An autoimmune disease in which the immune system attacks normal tissue components as if they were invading pathogens.
- Primarily occurs in the synovial joints-
Tendon and ligament elasticity and contractile power is lost
- Patho of RA
 - Phagocytosis produces enzymes within joint
 - The enzymes breakdown collagen causing edema, proliferation of the synovial membrane, and ultimately pannus formation
 - Pannus destroys cartilage and erodes the bone causing loss of articular surfaces and joint motion
 - Muscle fibers undergo degenerative changes
 - Blood vessels may also be affected which in turn affects the internal organs

Incidence

Rheumatoid Arthritis can affect anyone, including children, but 70 percent of people with RA are women. Onset usually occurs between 30 and 50 years of age.

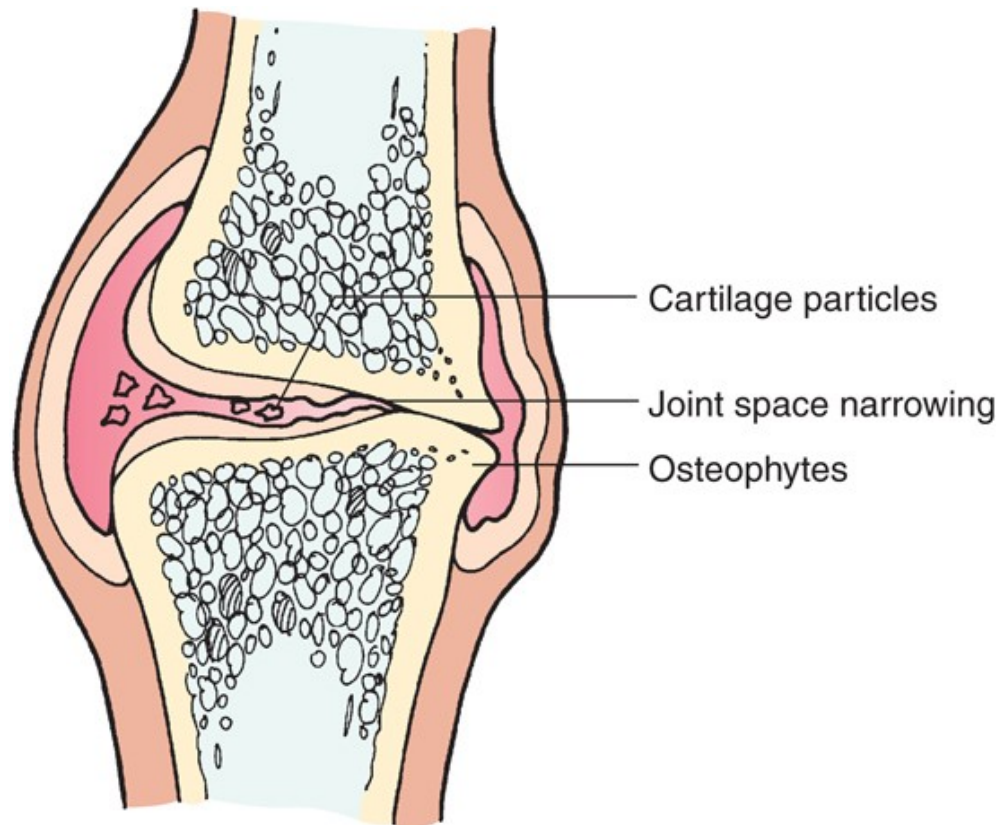
Arthritis Foundation 2005

Manifestations



- Loss of articular and joint motion
- Joint pain, swelling, warmth, erythema (especially in the morning)
- Rheumatoid nodules (advanced RA)
 - Nontender & movable-bony prominences
(shoulders/elbows)
- Lack of function → contractures & deformities
- Early Manifestations: joint inflammation, fever, fatigue, weakness, anorexia, loss of appetite
- Late Manifestations: anemia, weight loss, develop peripheral neuropathy, renal disease, joint deformities, early morning stiffness, severe pain
- Begins in small joints (hands, wrist, feet) then progresses to large joints (hips, shoulders, hips, elbows, ankles, cervical spine, temporomandibular)

Characteristic Degenerative Changes — “Degradation”



Rheumatoid Arthritis

Rheumatoid arthritis
(late stage)

Boutonniere
deformity
of thumb

Ulnar deviation of
metacarpophalangeal
joints

Swan-neck deformity
of fingers



Clinical Manifestations

(classic symptoms)

- Joint pain
- Swelling
- Warm
- Erythema
- Lack of function



Clinical Manifestations (Extra-articular features)

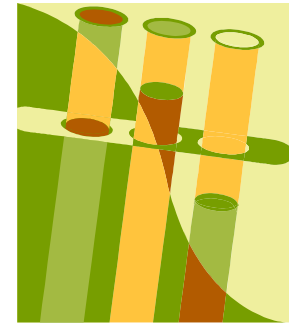
- Fever- due to inflammatory response
- Weight loss
- Fatigue
- Anemia
- Lymph node enlargement
- Raynaud's phenomenon
- Arteritis
- Neuropathy
- Scleritis
- Pericarditis
- Splenomegaly
- Sjogren's syndrome-dry eyes and dry mucous membranes
- Caplans Syndrome- presence of RA nodules in the lungs; primarily found in pts who work in coal mines or are exposed to asbestos

Question

Clinical manifestations of rheumatic disease include which of the following?

- a. Joint swelling
- b. Limited movement
- c. Pain
- d. All of the above

Diagnosis



- Assessment findings
- Rheumatoid factor
 - Presence alone is not diagnostic of RA
 - Present in $\frac{3}{4}$ of patients diagnosed
 - Absence does not rule out the disease
- Elevated erythrocyte sedimentation rate (ESR)-
What does ESR measure? Inflammation; it also helps monitor how effective treatment is
 - Procedure: A specific amount of diluted, unclotted blood is placed in a special narrow tube and left undisturbed for exactly one hour. The red cells settle towards the bottom of the tube, and the pale yellow liquid (plasma) rises to the top. After 60 minutes, measurements are taken of the distance the red cells traveled to settle at the bottom of the tube. Two methods, the Westergren and the Wintrobe, are used by laboratories; each method produces slightly different results. Most laboratories use the Westergren method.
 - Normally red cells don't settle far toward the bottom of the tube. Many diseases make extra or abnormal proteins that cause the red cells to move close together, stack up, and form a column (rouleaux). In a group, red cells are heavier and fall faster. The faster they fall, the further they settle, and the higher the ESR.
 - the more severe the disease the higher the sed rate is
- Low RBCs and C4 complement component

- C-reactive protein and antinuclear antibody (ANA) test results may be positive
- Cloudy, milky, or dark yellow synovial fluid- containing leukocytes (arthrocentesis performed)
- X-ray studies: bony erosions and narrowed joint spaces (x-ray of the hands and feet should be performed at baseline then q 3yrs to monitor progression of the disease)

Which one of these tests are used to diagnose R.A? No one test can diagnose RA, they are all used in the dx of RA

Revised Criteria of the American Rheumatism Association for the Classification of Rheumatoid Arthritis

- 1 Morning stiffness in and around joints lasting at least 1 hr before maximal improvement
- 2 Soft tissue swelling (arthritis) of three or more joint areas (including right and left hand , wrist, elbow, knee, ankle, and feet joints)
- 3 Swelling of at least one wrist or hand joint
- 4 Simultaneous symmetrical swelling in joints listed in criterion 2
- 5 Subcutaneous rheumatoid nodules
- 6 Presence of rheumatoid factor
- 7 Radiographic erosions or peri-articular osteopenia in hand or wrist joints

Data from Arnett, F.C., et al. (1988). The American Rheumatism Association 1987 revised criteria for the classification of rheumatoid arthritis. *Arthritis and Rheumatism*, 31, 315-324.

* Rheumatoid arthritis is defined as having at least 4 of 7 of the criteria above.

Treatment



- Rest, splinting of affected joints
- Exercise programs
 - PT/OT
- Medications- medical management begins with NSAIDS & salicylates
 - Salicylates (asprin), NSAIDs (anti-inflammatory and analgesic)
 - Cyclo-oxygenase (COX-2 inhibitors)- Ex. Celebrex- block enzyme involved in inflammation while leaving intact enzyme involved in protecting gastric lining- have less stomach upset than NSAIDS; use with caution also associated with increase risk of CVD.
 - Antirheumatic agents
 - Antimalarials (DMARDS)- need freq eye exams
 - Methotrexate- an immunosuppressant so assess pt for bone marrow suppression; pt may/can get ulcers, alopecia, skin rashes, and infections ; methotrexate is successful in preventing both joint destruction and long term disability
 - More aggressive cases- early bony erosions seen on x-ray
 - Biologic response modifiers (group of agents that consist of molecules produced by cells of the immune system or by cells that participate in inflammatory reactions)
 - Remicade- to treat severe RA; administered IV ONLY and is very expensive
 - Remicade is a tumor necrosis blocking agent
 - If pt has MS or TB pt can NOT use this med
 - Pt will be given PPD test to rule out TB before starting remicade

Treatment



- Persistent , Erosive RA
 - Reconstructive surgery- in advanced stages (surgery not performed during disease flare up)
 - Corticosteroids- decrease inflammatory process; systemic corticosteroids used when pt has unremmiting inflammation and pain or needs “bridging” med while waiting for slower meds (methotrexate) to work . For severely inflammed large joints, local injection may be used.
- Advanced, Unremitting RA
 - Immunosuppressive agents (affect the production of antibodies at the cellular level)
 - Cytosan, Imuran- these are highly toxic and can produce bone marrow suppression, anemia, GI disturbances, and rashes
- Other Medications
 - Antidepressants- in late stages for depression and sleep deprivation
 - Zoloft, Paxil, Elavil
 - Prosorba- filters plasma to rid of antibodies attacking the body (passive artificial immunity)
 - Apheresis- process of filtering plasma
 - Prosorba- a protein A immunoabsorption column; used in 12 weekly 2hr apheresis treatments to bind immunoglobulin G

The goal of treatment is to control symptoms and prevent destruction of the joints.



Nutrition Therapy

- Foods high in vitamins, protein, and iron
- Anorexia
 - Small frequent meals
 - Protein supplements
 - Oral corticosteroids (increase appetite (which may lead to weigh gain))
 - Calorie-count
 - Foods high in Calcium
 - Taking fish oil- omega 3 fatty acids; dose 2.5-5g/day
 - Disadvantage is that fish oil is antagonist to anticoagulants; so do NOT take if taking aspirin

Nursing Management

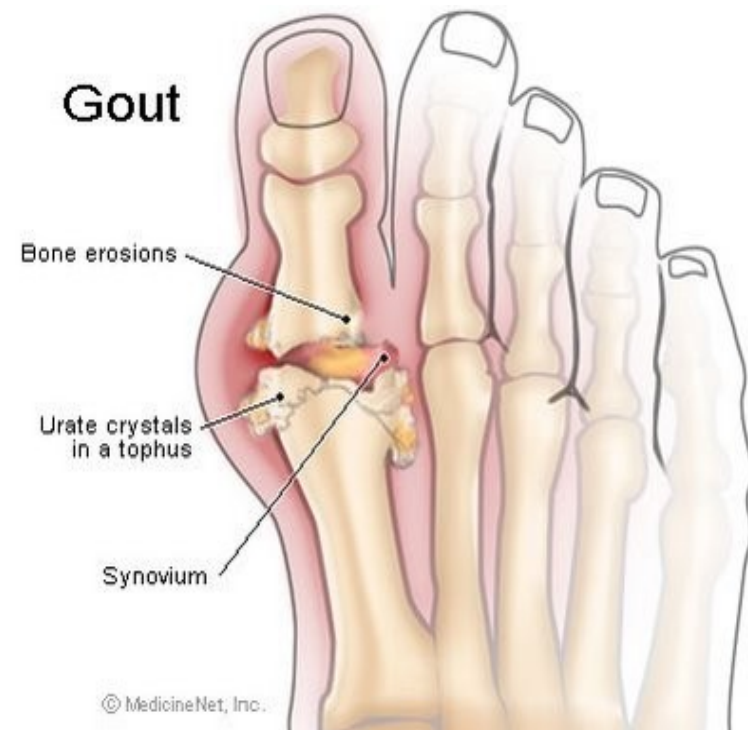
- Pain
- Sleep disturbance
- Fatigue
- Altered mood
- Limited ROM/mobility

GOUT

Presented by: Shelita Montgomery MSN, RN.



Gout

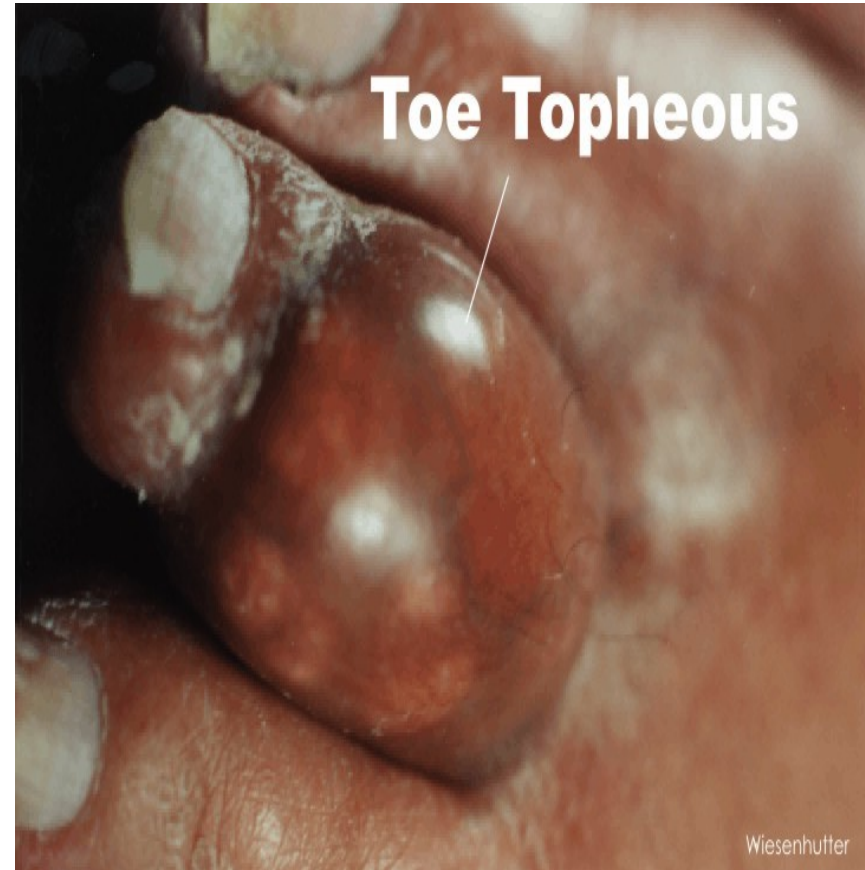


Gout

- Uric acid is a substance that results from the breakdown of purines, which are part of all human tissue and are found in many foods.
- Normally, uric acid is dissolved in the blood and passed through the kidneys into the urine, where it is eliminated.
- Gout is a heterogeneous group of conditions related to a genetic defect of purine metabolism that results in hyperuricemia (oversecretion of uric acids)
- Hyperuricemia (serum concentration greater than 7mg/dL) also may result when a person eats too many high purine foods: liver, dried beans, peas, anchovies, gravies, alcohol, shellfish, red meats, ect
- A definitive diagnosis of gouty arthritis is established by polarized light microscopy of the synovial fluid of the involved joint.

Gout

- **Primary Hyperuricemia**- increased serum levels of uric acid, faulty uric acid metabolism. Can be caused by severe dieting, starvation, alcoholics, or eating an excessive amount of foods high in purines
- **Secondary Hyperuricemia**- is secondary to a genetic or acquired process including conditions that cause a rapid turnover in cell production: leukemia, multiple myeloma, some types of anemia, and psoriasis.
- **Attacks** related to sudden increase or decrease of uric acid levels.
- **Tophi**- accumulation of sodium urate crystals are deposited in peripheral areas of the body or tissues (great toe, hands, and ear)



Four Stages of Gout

- **Asymptomatic hyperuricemia-** in this stage a pt has elevated levels of uric acid in the blood but NO OTHER SYMPTOMS
- **Acute gouty arthritis-** in this stage hyperuricemia has caused the deposit of uric acid crystals in the joint space. This leads to a sudden onset of intense pain and swelling in the joints, which may be warm and very tender. An acute attack commonly occurs at night and can be triggered by stressful events, alcohol/drugs, or the presence of another illness. (early attacks usually subside within 3-10 days and the next attack may not occur for days, months, or years.)
- **Intercritical gout-** this is the period between acute attacks. In this stage a person has no symptoms and has normal joint function.
- **Chronic tophaceous gout-** this is the most disabling stage of gout and usually develops over a long period of time, such as 10 years. The disease has now caused permanent damage to the affected joint and pt may also have kidney damage at this point.

Medical Management

- **Colchicine (oral/parental)-** administered as soon as attacks begin and usually start to work within 12hrs. Doses are increased until either the pain has subsided or diarrhea occurs. Colchicine interferes with leukocyte infiltration which reduces inflammation
- **NSAIDS (Indomethacin)-** used for acute attacks
- **Corticosteroids-** relieve acute attacks and used in pts who have no response to other therapy
- **Probenecid (Benemid)-** prevents tophi formation; be alert for nausea and rash
- **Allopurinol-** blocks uric acid formation by interrupting the breakdown of purines; side effects are bone marrow suppression, depression, vomiting, and abdominal pain.

Nursing Management

- Restrict consumption of food high in purines
- Avoid factors that increase pain and inflammation
- Maintain normal body weight

Gout

Caused by hyperuricemia due to oversecretion of uric acid or a renal defect resulting in decreased excretion of uric acid, or a combination of both.

Nursing Management

Restrict foods
in purines

Limit alcohol

Be compliant



Manifestations

Elevated uric acid
(greater than 7 mg/dL)
Acute gouty arthritis
Tophi ..hyperlinks\Tophi.ppt

Medical Management

Colchicine
NSAIDs
Uricosuric agents
(Probenecid)
Allopurinol
Corticosteroids

} Pain

Case Studies

- 1. A patient you are caring for has been diagnosed with a rheumatic disease. In developing a plan of care this patient, a priority nursing diagnosis is Acute and chronic pain. Discuss priority nursing interventions related to this nursing diagnosis.
- 2. There are several medications used in the treatment of rheumatic diseases. Describe medication-induced side effects related to these medications.
- 3. You are caring for a patient with systemic lupus erythematosus. Based on the pathophysiology of this disease, what clinical manifestations would you expect?

Noninfectious Inflammatory Dermatoses

Presented By:

Shelita Montgomery MSN, RN.

Terminology

- Keratin- A scleroprotein or albuminoid present in the hair and nails.
- Pruritic- itching.
- Dermatoses- any abnormal skin lesion.
- Telangiectasias- A lesion formed by a dilated capillary or terminal artery, most commonly on the skin.

Psoriasis

- Chronic dermatitis, which involves excessively rapid turnover of epidermal cells.
- This chronic disease stems from a hereditary defect that causes overproduction of keratin.
- Periods of emotional stress and anxiety aggravate this condition; trauma, infections, seasonal and hormonal changes also are a trigger factor



Psoriasis



Pathophysiology of Psoriasis

- Cells in the basal layer of the skin divide to quickly
- The newly formed cells move to rapidly to the skin surface and that become evident by profuse scales or plaques
- As a result of the increase number of basal cells and rapid cell passage, the normal events of cell maturation and growth cannot occur
- This prevents formation of the normal protective layer

Clinical Manifestations

- Lesions may appear as red, raised, patches of skin covered with silvery scales. (are dry and may be pruritic)
- Multiple bleeding areas- are produced when the scales are scraped away and the dark red base of the lesion is exposed
- May be cosmetic or physically disabling and disfiguring disorder.
- May involve nail beds, palms of hands and feet.
- Bilateral symmetry
- Psoriasis can lead to arthritis
- Lesions are seen on the scalp, extensor surface of elbows and knees, lower back, and genitalia
- Nails involved can occur with pitting, discoloration, crumbling beneath the free edge and separation of the nail plate



Complications

- Asymmetric rheumatoid factor-negative arthritis of multiple joints.
- Erythrodermic psoriasis- is an exfoliative psoriatic state; involves disease progression over the total body surface.
 - The pt is acutely ill
 - pt will have fever, chills, and an electrolyte imbalance



Assessment and Diagnostic Findings

- Presence of plaque-type lesions- usually confirm diagnosis of psoriasis
- No significant blood tests
- Assess for signs of nail and scalp involvement

Medical Management

- Oils or coal tar preparations added to bath water
- Emollient creams containing alpha-hydroxy acids
- Topical corticosteroids
- Photo-chemotherapy
- Most important principle of psoriasis is gentle removal of scales
 - Oils (olive oil, mineral oil, Aveeno oilated Oatmeal Bath) or coal tar preparations (Balnetar) can be added to bath water and soft brush used
 - After bathing: emollient creams that contain alpha-hydroxy acids (Lac-Hyderin Penedern) or salicylic acid; softens thick scales
 - Topical agents used to slow overactive epidermis

Nursing Diagnosis

- Impaired skin integrity related to lesions and inflammatory response
- Deficient knowledge about the disease process and treatment
- Disturbed body image related to embarrassment over appearance and self-perception of uncleanness.

Nursing Interventions

- Promoting understanding of skin condition
 - Increasing skin integrity
 - Improving self-concept and body image
-
- Explain with sensitivity that although there is no cure lifetime management is necessary, condition can be controlled.
 - Avoid irritation or injury to the skin (cut, abrasion, sunburn)
 - It is emphasized that reported trauma to skin and an unfavorable environment (cold) or a specific med (lithium, beta blockers, indomethacin) may exacerbate psoriasis
 - Reviewing and explaining the treatment are essential to ensure compliance
 - To avoid injuring the skin, the pt is advised not to pick at or scratch the affected areas
 - Measures to prevent dry skin are encouraged b/c dry skin worsens psoriasis
 - Too-frequent washing produce more soreness and scaling
 - Water should be warm, not hot, and skin should be dried by patting with a towel rather than by rubbing

Questions?

COMMENTS?